

## Microbial Growth and maintenance

General Microbiology  
Medical Laboratory Technology (MLT), Part-I, 1<sup>st</sup> Semester, 2022

1

MLT-Part-I, Microbiology by Dr Shaista Bano  
Associate Professor

16 October 2022

1

### Microbial Growth

- ▶ The term microbial growth refers to the growth of a population (or an increase in the number of cells), not to an increase in the size of the individual cell. Cell division leads to the growth of cells in the population.
- ▶
- ▶ Two Types of Asexual Reproduction in Microbes:
  - ▶ 1) **Binary Fission** - Bacterial reproduction occurs through fission, producing two daughter cells.
  - ▶ 2) **Budding** - A few bacteria and some eukaryotes (including yeasts) may also replicate by budding, forming a bubble-like growth that enlarges and separates from the parent cell.

▶ 2

MLT-Part-I, Microbiology by Dr Shaista

16 October 2022

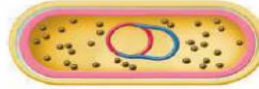
2

## Cell division by binary fission

(a) A young cell at early phase of cycle



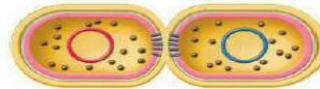
(b) A parent cell prepares for division by enlarging its cell wall, cell membrane, and overall volume. DNA replication then starts.



(c) The septum begins to grow inward as the chromosomes move toward opposite ends of the cell. Other cytoplasmic components are distributed to the two developing cells.



(d) The septum is synthesized completely through the cell center, creating two separate cell chambers.



(e) At this point, the daughter cells are divided. Some species separate completely as shown here, while others remain attached, forming chains, doublets, or other cellular arrangements.



► 3

MLT-Part-I, Microbiology by Dr Shaista

16 October 2022

3

## Phases of microbial growth

► Phases of Growth -

► 1. **Lag Phase** - In the lag phase, the number of cells doesn't increase. However, considerable metabolic activity is occurring as the cells prepare to grow.

►

► 2. **Log Phase (logarithmic or exponential phase)** - cell numbers increase exponentially; during each generation time, the number of cells in the population increases by a factor of two.

►

► 3. **Stationary Phase** - The number of cells doesn't increase, but changes in cells occur: cell become smaller and synthesize components to help them survive longer periods without growing

►

► 4. **Death Phase** - In this phase, cells begin to die out. Death occurs exponentially, but at a low rate.

►

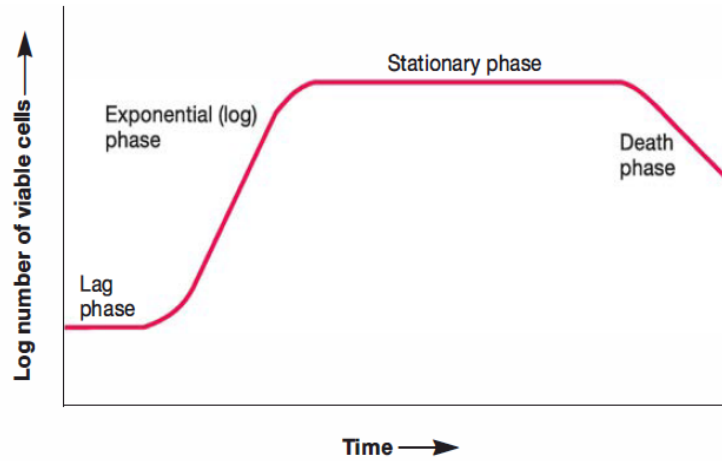
► 4

MLT-Part-I, Microbiology by Dr Shaista

16 October 2022

4

### Growth curve



▶ 5

MLT-Part-I, Microbiology by Dr Shaista

16 October 2022